



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/295,329	04/21/1999	YASUMASA KAWABE	Q54114	7050

7590

04/22/2003

MARK BOLAND
SUGHRUE MION ZINN MACPEAK & SEAS
2100 PENNSYLVANIA AVENUE N W
WASHINGTON, DC 200373202

EXAMINER

THORNTON, YVETTE C

ART UNIT	PAPER NUMBER
----------	--------------

1752

DATE MAILED: 04/22/2003

490

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-40

Office Action Summary	Application No. 09/295,329	Applicant(s) KAWABE ET AL.	
	Examiner Yvette C. Thornton	Art Unit 1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-26 is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1752

DETAILED ACTION

This is written in reference to application number 09/295329 filed on April 21, 1999 and CPA filed on September 9, 2000.

Request for Continued Examination (RCE)

1. The request filed on February 10, 2003 for a Request for Continued Examination (RCE) under 37 CFR 1.53(d) based on parent Application No. 09/295329 is acceptable and a RCE has been established. An action on the RCE follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suwa (EP 789,278). Suwa teaches a radiation sensitive resin composition comprising a resin containing an alicyclic skeleton in its backbone (A), and acid generating agent (B), an acid cleavable additive, a nitrogen containing basic compound and additives such as surface active agents. The said resin A may contain at least one group, which is cleaved by an acid at any position thereon. The alicyclic skeleton may optionally contain one or more substituents. The said resin is preferably a resin, which becomes alkali soluble due to catalytic action of an acid to cleave the acid cleavable groups. Preferred alicyclic skeletons are given by the general formula (2) (page 3, l. 20-15, l. 57). The taught acid generating agent can be selected from the group

Art Unit: 1752

consisting of onium salts, halogen containing compounds, diazoketone compounds, sulfone compounds and sulfonic acid compounds (pg. 16, l. 1-pg. 17, l. 3). The said acid generators can be used singly or in combination of two or more. The acid generator is present in the amount of 0.1-10 pbw per 100 pbw of the resin (pg. 17, l. 4-9). Suwa teaches that the addition of an acid cleavable additive serves to improve contrast as a positive type photoresist and increase affinity of the resin for an alkaline developing solution. The said additive includes polymeric compounds or low molecular weight compounds having at least one acid cleavable group (pg. 17, l. 10-15). Specific examples include t-butyl adamantane carboxylate, cholic acid t-butyl ester, etc. (pg. 17, l. 58-pg. 18, l. 9). The addition of a compound, which acts as a Lewis base to an acid generated from the acid generating agent, improves perpendicularity of the side walls formed by a positive working resist system. Specific examples of such compounds include tri-n-butylamine, triethanolamine and 2-methylpyridine (pg. 18, l. 15-28). A variety of other additives can optionally be added to the resin composition. These additives include surface active agents such as FLUORAD FC430, FC431, SURFLON S-382, SC-101 and the like (pg. 18, l. 36-44). It is the examiner's position the taught FLUORAD compounds meet the limitation of a fluorine containing surfactant and the SURFLON compounds meet the limitation of a silicon containing surfactant. The said additives can be used singly or as a mixture of two or more. The composition solution is prepared by dissolving the taught components in a solvent. Suitable solvents include propylene glycol monoethyl ether acetate, 2-heptanone, methyl 3-methoxypropionate and ethyl 3-ethoxypropionate, ethylene carbonate, propylene carbonate and so forth (pg. 19, l. 5-26). The solvents can be used in singly or in a mixture of two or

Art Unit: 1752

more. A variety of radiation types can be used to expose the resist composition. Examples include far UV radiation such as KrF and ArF (pg. 19, l. 30-37). In example 5, Suwa exemplifies a resin composition comprising resin AIII-4 (pg. 25, l. 25-pg. 26, l. 25), 4-hydroxynaphthyltrimethylsulfonium triflate as an acid generating agent, tri-n-butylamine as the acid cleavable additive, and a solvent mixture of ethyl 2-hydroxypropionate and 2-heptanone (pg. 42, l. 35-pg. 43, l. 25; Table 2). It is the examiner's position that the exemplified acid generator meets the limitation of an onium salt and the said acid cleavable additive meets the limitation of a low molecular acid decomposable compound as claimed by the applicant. One of ordinary skill in the art would have been motivated by the teachings of Suwa to include either a single or a combination of two or more surface active agents into the exemplified composition of example 5 in order to improve the coating properties. Although a solvent mixture of three components is not exemplified one of ordinary skill in the art would have been enabled by the teachings of Suwa to use two or more of the disclosed solvents to prepare the taught composition.

Response to Arguments

4. Applicant's arguments filed February 10, 2003 have been fully considered but they are not persuasive. Applicants argue that the cited prior art of Suwa (EP 789278) fails to teach or disclose the problem of development defects that can be improved by the use of the claimed combination of a basic compound and a surfactant containing either silicon or fluorine.

5. The examiner has reviewed the comparative data presented in the declaration submitted on February 13, 2003. The said declaration is identical to the declaration

Art Unit: 1752

submitted on August 30, 2002 except that the value for the "Angle between Substrate and Sidewall" for comparative example b' has been changed from "86" to the correct value of "85". The examiner however maintains the position that the declaration is unconvincing.

6. Applicants evaluate comparative data by two distinct parameters: (1) residual film rate and (2) profile. The numbers presented in the inventive examples for residual film rate are 99.3% and 99.6%. The numbers presented for the comparative examples are 94.6% and 95.2%. Applicants argue that the difference in the inventive examples and the comparative examples presents an extremely large difference in the art and is considered to be an unexpected result to one of ordinary skill in the art. The applicant however has provided no evidence that such a difference is indeed substantial. In *re* Klosak (173 USPQ 14) has established that, "it is not enough to show that results are obtained which differ from those obtained in the prior art: that difference must be shown to be an unexpected difference." See also *In re* Freeman (177 USPQ 139). Applicants merely state on the record that the results are unexpected. There is no evidence which shows that the difference in residual rates for the inventive and comparable examples to be substantial and unexpected to one of ordinary skill.

7. Applicants attempt to show that the differences of 0.3 and 0.6 are indeed significant to one of ordinary skill in the art by submitting the prior art reference US 4,719,167. the said reference exemplifies that 2% difference in fractional film thickness. The examiner has found no correlation which would indicate that a 2% difference in fractional film thickness as evaluated by the prior art is related to residual film rate as claimed by the applicant. Therefore, the said reference can not be relied upon to show that the differences in the

Art Unit: 1752

declaration data is significant and therefore unexpected. The examiner maintains her position.

8. In regard to profile, applicants provide two definitions. Profile A, which is a rectangular pattern, and profile B, which is anything other than rectangular. Applicants further define profile A to have an angle of 85-90 between the substrate and the sidewall, wherein 88-89 is particularly preferred. Profile B has an angle of 80-85. The angles presented for the inventive examples are 89 and 88. The angles presented for the comparative examples are 85 and 85. The examiner is unclear as to why the comparative examples are labeled as profile B, when the angles are clearly within the range of profile A.

9. The newly submitted declaration corrects a typographical of the second comparative example. However, it does not provide any clarification as to how a profile having an angle at 85 degrees is determined to be an A profile or a B profile. The definitions of profile A and profile B both contain the point of 85 degrees. Furthermore, there is no evidence that the comparative examples of declaration data having an angle of 85 degrees is any different than the inventive examples having an angle of 88-89 degrees. The examiner maintains the position that the declaration evidence of record fails to show unexpected results.

Allowable Subject Matter

10. Claims 16-26 are allowed.

11. The following is an examiner's statement of reasons for allowance: The comparative data II (Table B and B') were successful in showing unexpected and superior results upon using a solvent mixture within the limitations of instant claims 16-22 as compared to the prior art.

Art Unit: 1752


12. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

14. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet C. Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

15. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.

yct
April 16, 2003


JANET BAXTER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700